DEPARTMENT OF HEALTH & HUMAN SERVICES

132432

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

MEMORANDUM

Date: July 29, 1998

From: Senior Regional Representative
ATSDR Region III

Subject: Health Consultation
Osborne Landfill

To: Frank Vavra
EPA Remedial Project Manager (3HS22)

Enclosed is a copy of the health consultation for the Osborne Landfill, Grove City, Mercer County, Pennsylvania, dated July 9, 1998. This health consultation is in response to the U.S. Environmental Protection Agency (USEPA) Region III's request to evaluate the past threat to residents from groundwater contaminated with Vinyl Chloride (VC) and respond to community concerns regarding cancer. The Pennsylvania Department of Health (PADOH), prepared this health consultation under a cooperative agreement with the Agency for Toxic Substances and Disease registry (ATSDR).

The primary intent of this health consultation is to inform you of the actions PADOH has recommended in order to prevent or mitigate exposures to the contaminants of concern at the site. Upon your review, please inform us if you plan to take any action to address all or some part of the recommendations made. Also, please inform us if you discover significant errors in the document which could change its conclusions and recommendations. I can be reached at telephone number (215) 814-3139 or for written responses at the address listed below.

Thomas Walters Jr.

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Attachment

cc: Montie Howie, Jr., ATSDR/DHAC/PERIS
James Hargettt, USEPA w/attachment
Mark Gorman, PADEP, Northwest Region w/attachment
Michelle Hughes, PADOH, Northwestern District w/attachment

Health Consultation

OSBORNE LANDFILL

GROVE CITY, MERCER COUNTY, PENNSYLVANIA

CERCLIS NO. PAD980712673

JULY 9, 1998

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

OSBORNE LANDFILL

GROVE CITY, MERCER COUNTY, PENNSYLVANIA

CERCLIS NO. PAD980712673

Prepared by:

Pennsylvania Department of Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

SUMMARY

At the request of the Environmental Protection Agency (EPA), the Pennsylvania Department of Health (PADOH) prepared this Health Consultation (HC), under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), to evaluate the past threat to residents from groundwater contaminated with Vinyl Chloride (VC) and respond to community concerns regarding cancer. Based on available information, PADOH determines that groundwater at the Osborne Landfill no longer presents a public health hazard because there are no ongoing exposures through private wells . The site is being remediated by the EPA and area residences with contaminated wells have been connected to the public water supply. EPA is regularly monitoring the uncontaminated wells of residents who declined to connect to public water supply.

Residents in one household may have been exposed to elevated levels of vinyl chloride in the past through drinking contaminated well water though the level of exposure is not expected to cause adverse health effects. PADOH recommends continued monitoring of the residential wells still in use to prevent future exposure.

To respond to the community's concern of cancer, PADOH reviewed 10 years of cancer mortality and cancer incidence data and concluded there were no elevated levels of cancer that may be related to the site.

BACKGROUND AND STATEMENT OF ISSUES

The Osborne Landfill is on Diamond Road in Pine Township, Mercer County, Pennsylvania and less than one mile east of Grove City (Figures 1 and 2). The site is a former strip mine surrounded by farmland to the east and southeast, wetlands and ponds to the south and west, and a wooded residential development to the north. The nearest home is about 1000 feet west of the site (Figure 2). That home and all but two others (with clean private wells) near the site are now on an approved public water supply.

From the late 1950s to 1978, fill material and various industrial wastes were deposited in the pit. Wastes included polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), lead, chromium, volatile organic compounds (VOCs), and foundry waste from nearby Cooper Industries (1). The Pennsylvania Department of Environmental Protection (PADEP) closed the site in 1978 because it did not have a permit to accept wastes. In 1989, the Environmental Protection Agency (EPA) conducted a Remedial Investigation/Feasibility Study (RI/FS) to determine the nature and extent of contamination in groundwater, surface water, soil, and sediments. A 1990 Record of Decision (ROD) required the installation of a slurry wall around the fill area, a clay cap, and installation of a leachate extraction and treatment system. That remedy has been constructed and is now operational (1). A more complete and detailed site history is contained in the December 1997 ROD for the site by EPA and the December 1995 focused Remedial Investigation Report, Operable Unit 2 (2).

Disposal of wastes in an unlined strip mine caused groundwater contamination beneath and near the site (2). Mining operations always create unnatural voids and channels in the subsurface and greatly complicate groundwater flow directions and the distribution of contaminants. Complex well contamination patterns sometimes emerge. Consequently, water wells at great distance and/or in apparent cross-gradient or upgradient directions from the contaminant source may be affected. At this site, one residential well, beyond the monitoring well network, was found to have vinyl chloride (VC) at levels of health concern. The purpose of this health consultation is to evaluate past human exposure and health risks of residents exposed to vinyl chloride (VC) through that private well and the community's concern of cancer.

DISCUSSION

<u>Contamination and Human Exposure</u> (Table 1,2,3)

Vinyl chloride, a known human carcinogen, is present in the groundwater beneath the site. Four four mine void monitoring wells showed VC concentrations from 2 to 5 μg/L in a 1995 sampling round (Figure 3). Though the eastward extent of the plume appeared to be characterized by monitoring wells MWV3, MWV4, and MWV6, a series of sampling events in 1993 and 1994 revealed VC at a concentration varying from less than 1 to 16 μg/L in one residential well (HW-1)

(Figure 3) that is beyond the monitoring well perimeter. That concentration is about an order of magnitude 10 times higher than the concentration in MWV4 some 550 feet closer to the site. Furthermore, the residential well in question is the only well affected by site contaminants based upon EPA's repetitive sampling of seven wells near the landfill.

Occupants of the home have been on public water since the summer of 1994 when Cooper Industries, under pressure from EPA, extended a supply line along Enterprise Road and Diamond Roads (1 and Figure 3). The current occupants moved into the home in 1980. There is no historic information on when this residential well was first contaminated. The PADOH has no information on previous occupants of the home.

Area homes are now connected to the public water supply except for two homes whose wells are clean and continue to be monitored by EPA (oral communication with EPA).

Vinyl Chloride Toxicology Evaluation

Vinyl Chloride was detected in one residential well at concentrations varying from less than 1 to 16 μg/L (1). Two adult residents live in this household. Groundwater usage (i.e. drinking, cooking, showering) can expose residents to VC through inhalation, ingestion, or dermal absorption.

Some people who have breathed VC for several years developed hepatic abnormalities. Greater than expected incidences of angiosarcoma of the liver in workers occupationally exposed to VC were reported. Angiosarcoma of the liver is a very rare type of cancer. Some people who had worked with VC have nerve damage, and others have developed an immune reaction. Some polyvinyl chloride production workers exposed to very high levels of VC also have problems with the blood flow in their hands (3). The lowest levels that cause liver changes, nerve damage, and the immune reaction in humans are not known. However, these levels of occupational exposure to VC are over several magnitudes higher than the levels normally found in the residential settings. Health effects are not expected from inhalation exposure at this site.

No studies were found regarding the health effects on humans through oral exposure. However, animal studies have shown hematological and hepatic effects among animals fed diets containing high concentrations of VC. To evaluate noncancerous effects on humans, ATSDR has developed a chronic oral Minimum Risk Level (MRL) of 0.00002 mg/kg/day based on animal studies that demonstrate changes in the livers of animals orally exposed to VC (3). MRL is an estimate of a daily exposure to a contaminant below which noncancerous, adverse health effects are unlikely to occur. The two residents who used the contaminated well for drinking water are unlikely to ingest enough vinyl chloride to attain the doses at which adverse health effects have been observed in humans or laboratory animals (based on the average concentration level of 8.0 μg/L).

EPA has classified VC as a human carcinogen. The U.S. Department of Health and Human Services (DHHS) has determined that VC is a known carcinogen. Likewise, the International

Agency for Research on Cancer (IARC) has determined that VC is carcinogenic to humans. EPA is currently reviewing the carcinogenic risk associated with VC. Therefore, neither the Cancer Risk Evaluation Guide (CREG) nor an oral Cancer Slope Factor (CSF) is available for this substance, and the related calculation of the increased risk of cancer health outcomes associated with exposure to VC cannot be made at this time.

Health Outcome Data Evaluation

In response to community concerns, health outcome data were gathered and reviewed routinely at the the townships or boroughs level. Evaluation of the health outcome data for geographical areas smaller than the township is difficult because the townships or boroughs are the smallest geo-unit, for which the State Center for Health Statistics normally aggregates and reports data.

PADOH reviewed the cancer mortality data (1986-1995) and cancer incidence data (1985-1994) for 23 types of cancer [Appendix] for Pine Township where the site is located. The review of the data did not reveal elevated cancer deaths and cancer incidences in the township except deaths from prostate cancer among men and non-Hodgkin's Lymphomas (NHL) among women compared to deaths in the state of Pennsylvania.

In general, suspected risk factors for prostate cancer include occupational exposure to cadmium and work in rubber manufacturing and farming [4,5]. Substantial epidemiologic evidence suggests that a diet high in fat, particularly animal or saturated fat, increases the risk of prostate cancer [6]. Factors related to sexual activity, including certain viruses, also are suspected risk factors, although evidence for this is relatively weak [6]. It is likely that sex hormones play some role in the development of prostate cancer [6]. In addition, a family history of prostate cancer in a first-degree relative appears to double the risk [7].

Some studies found that individuals at increased risk of the NHL include those with viral infections such AIDS and patients who are immunosuppressed subsequent to transplantation [8]. Individuals who work in occupations dealing with chemicals and agriculture may also be at increased risk of NHL. Exposure to certain phenoxy herbicides was implicated though the evidence is not conclusive [8]. A number of studies have been conducted concerning plastics manufacturing which involves vinyl chloride. Most studies, however, did not find an increased risk of NHL [8].

Since no data are available from the death certificate on personal risk factors, residential history, or occupational exposure, the causes of elevated prostate cancer mortality and NHL mortality in Pine township are not known. However, they are not believed to be associated with the site based on known risk factors for these two types of cancer.

There were no site-related contaminants reaching other residents except two residents who experienced vinyl chloride in their water supply. Because the number of people who were exposed to the contaminants was a very small number, no standard statistical analysis methods

can conclusively determine if any adverse health effects these people may have experienced, if any, were caused by the site.

CONCLUSIONS

Based on available information, PADOH determined human exposure pathways have been eliminated and the groundwater at the site no longer presents a public health hazard. Area residents are either connected to public water supply or appropriate actions are being taken to prevent human exposure from occurring in the future. These actions include plume containment and continuous monitoring of residential wells that are not connected to the public water supply. In addition, no children were reported to have lived in the residence with the contaminated well. Even if children visit the home occasionally one or twice a week, adverse health effects from past exposures are not expected to occur based on the level of contamination.

RECOMMENDATIONS

1. Continue using public water which has been supplied to area residents.

2. Continue monitoring wells near the site that are still being used for private water supplies.

REFERENCES

1. U.S.EPA, 1997. Record of Decision for Osborne Landfill site, Mercer County, Pennsylvania.

2. U.S.EPA, 1996. Focused Remedial Investigation Report, Operable Unit 2, Osborne Landfill site, Pine Township, Mercer County, Pennsylvania.

3. ATSDR, 1997. Toxicological Profile for Vinyl Chloride. U.S. Public Health Service, Atlanta, Georgia.

4. Rothenberg R, Nasca P, Mikl J, Burnett W, Reynolds B. Cancer. In: Amler RW, Dull HB, eds. Closing the Gap: The Burden of Unnecessary Illness. New York, NY: Oxford University Press; 1987:30-42.

5. Page HS, Asire AJ. Cancer Rates and Risks. 3rd ed. Bethesda, Md: National Cancer Institute; 1985. NIH publication 85-691.

6. Normura AMY, Kolonel LN. Prostate cancer: a current perspective. Epidemiol Rev. 1991;13:200-227.

7. Steinberg GD, Carter BS, Beaty TH, et al. Family history and the risk of prostate cancer. Prostate. 1990;17:337-347.

8. Schottenfeld D, Fraumeni J.F.Jr., Cancer Epidemiology and Prevention. New York, NY: Oxford University Press; 1996.

PREPARERS OF REPORT

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CERTIFICATION

This Health Consultation for the Osborne Landfill site was prepared by the Pennsylvania Department of Health Under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

Technical Project Officer, SPS, RPB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings

Chief SSAB, DHAC, ATSDR

FIGURES

Figure 1

Osborne Landfill Site Location Map

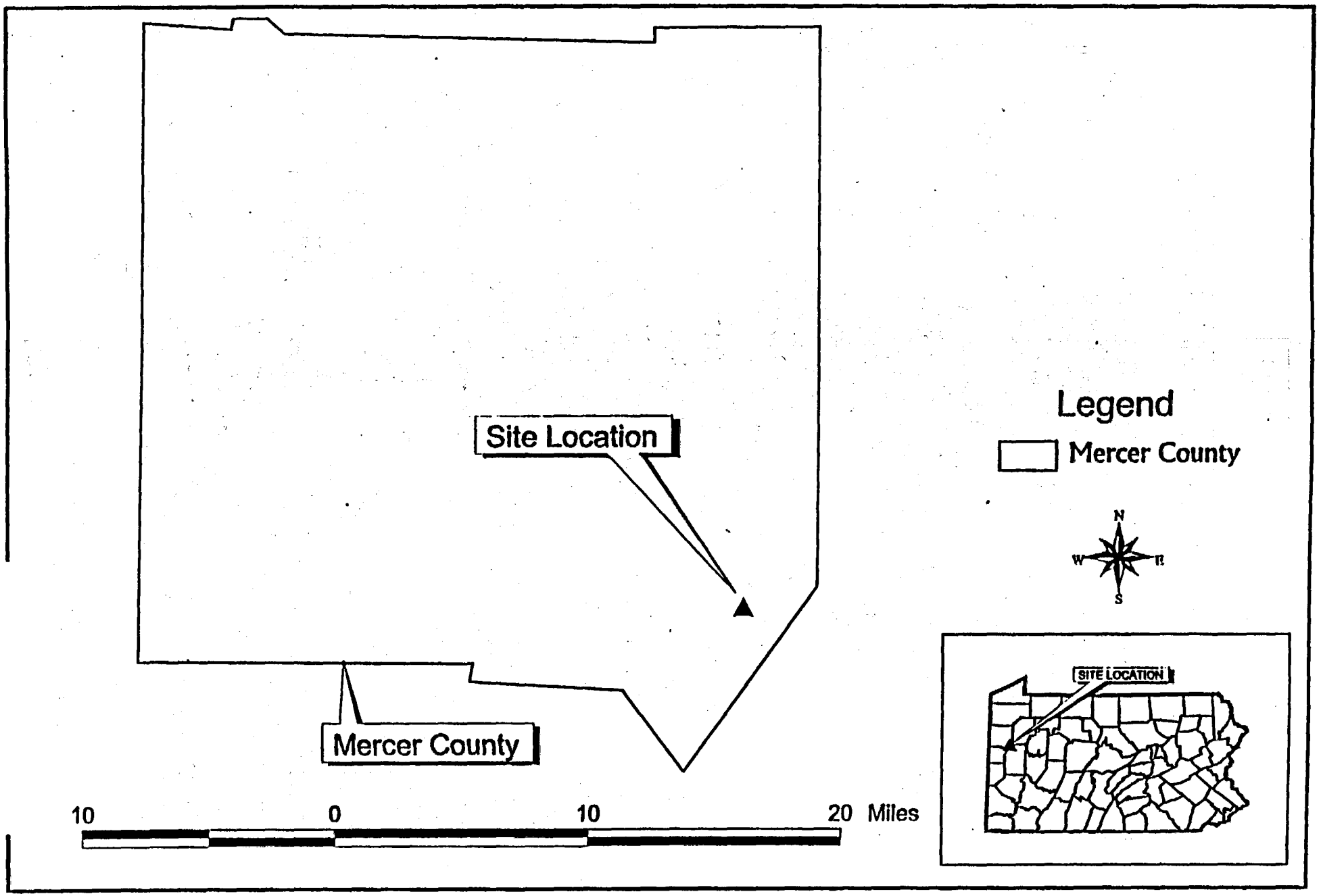

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Figure 2

Osborne Landfill Site Location

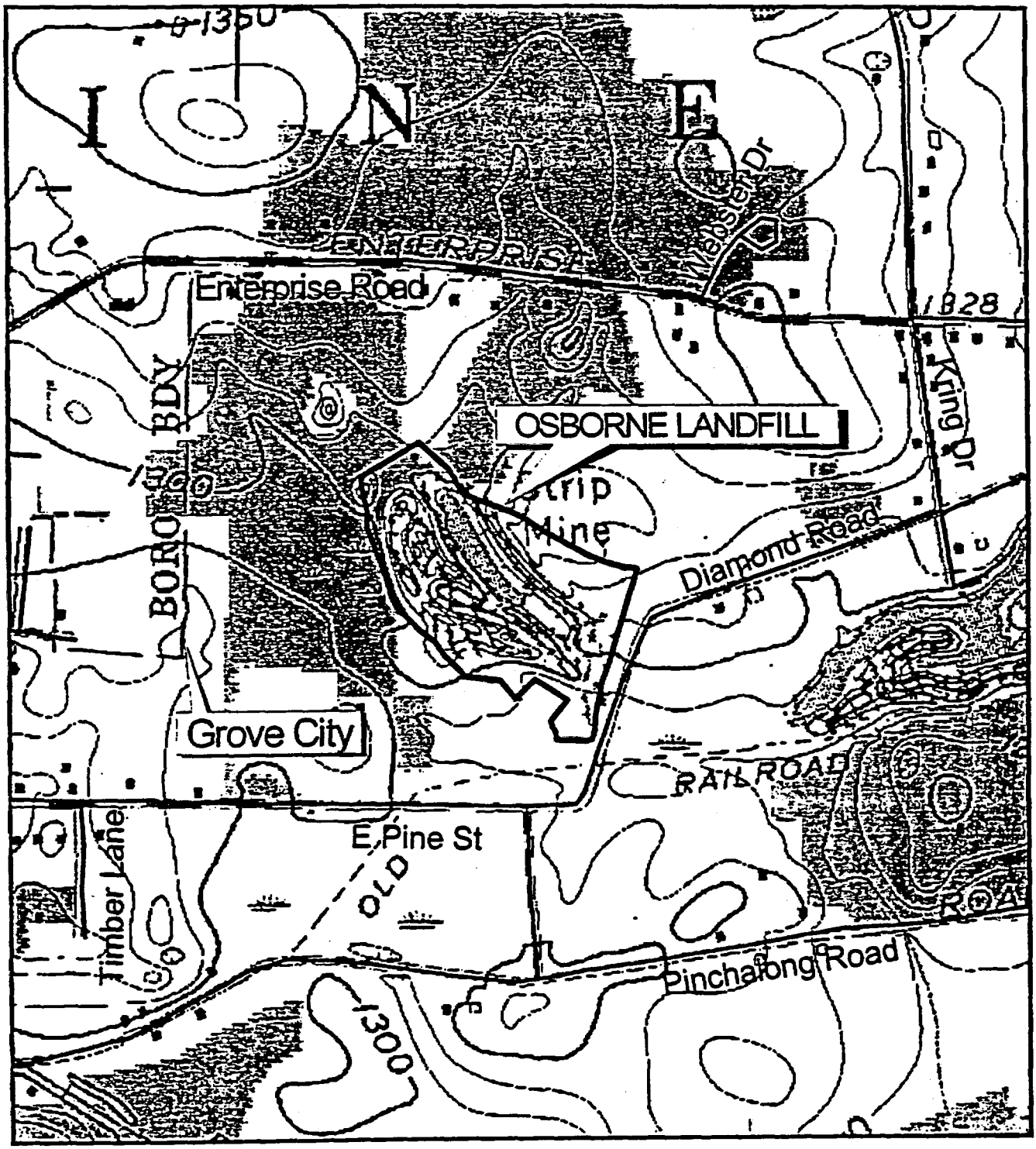
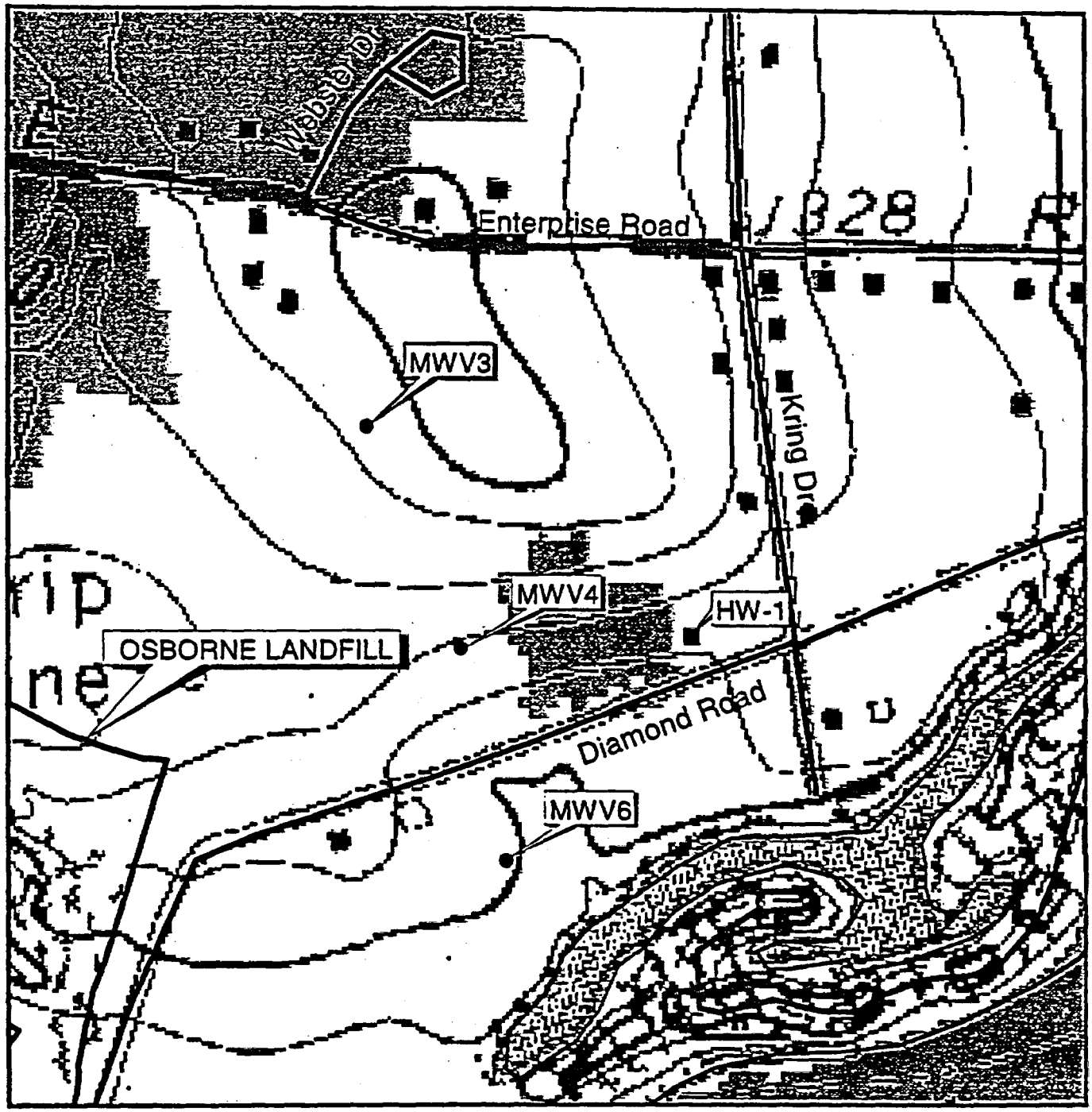


Figure 3

Osborne Landfill
Selected Wells



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TABLES

Table 1. Contaminants of Concern in Residential Wells

CONTAMINANTS	MAXIMUM CONCENTRATION (PPB)	COMPARISON VALUES	
		PPB	SOURCE
Vinyl Chloride (VC)	16	0.7	Chronic EMEG

EMEG - Environmental

Table 2. Estimated Number of Exposed Population

Pathway Name	Estimated Pop. in Pathway	Range Minimum	Range Maximum
Complete Pathways On-site	0	0	0
Complete Pathways Off-site	2	2	2
Total Completed On and Off-site	2	2	2

Table 3. Complete Exposure Pathway Table - Off Site

Pathway Name	Source	Medium	Exposure Point	Exposure Route	Receptor Population	Time of Exposure	Exposure Activities	Estimated Number Exposed	Chemicals
Private Wells	Osborne Landfill	Ground Water	Tap, Shower	Ingestion Inhalation Dermal	Off-site Residents	Past	Drinking Water, Showering	2	Vinyl Chloride

APPENDIX

APPENDIX

COMPARABILITY TABLE of ICD-O-2 and ICD-9 CODES for 23 PRIMARY CANCER SITES

PRIMARY SITE	ICD-O-2	ICD-9
Buccal Cavity and Pharynx	C00.0-C14.8	140.0-149.9
Esophagus	C15.0-C15.9	150.0-150.9
Stomach	C16.0-C16.9	151.0-151.9
Colon	C18.0-C18.9, C26.0	153.0-153.9, 159.0
Rectum, Anus, Rectosigmoid	C19.9, C20.9, C21.0-C21.8	154.0-154.8
Pancreas	C25.0-C25.9	157.0-157.9
Larynx	C32.0-C32.9	161.0-161.9
Trachea, Bronchus, Lung, Pleura	C33.9, C34.0-C34.9, C38.4	162.0-163.9
Melanoma of Skin	C44.0-C44.9 and M-8720 to M-8780	172.0-172.9
Female Breast	C50.0-C50.9 *	174.0-174.9
Cervix Uteri	C53.0-C53.9**	180.0-180.9
Corpus Uteri	C54.0-C54.9	182.0-182.9
Ovary	C56.9	183.0
Prostate	C61.9	185
Testis	C62.0-C62.9	186.0-186.9
Urinary Bladder	C67.0-C67.9	188.0-188.9
Kidney and Renal Pelvis	C64.9, C65.9	189.0-189.1
Brain and Other Nervous System	C70.0-C72.9	191.0-192.9
Thyroid	C73.9	193
Non-Hodgkin's Lymphomas	M-9590 to M-9595, M-9670 to M-9687, M-9690 to M-9709, M-9711 to M-9714, M-9740 to M-9741	159.1, 200.0-200.8, 202.0-202.2, 202.6, 202.8-202.9
Hodgkin's Disease	M-9650 to M-9667	201.0-201.9
Multiple Myeloma	M-9731 to M-9732	203.0, 203.8
Leukemias	M-9800 to M-9941	202.4, 203.1, 204.0-208.9

* Excludes males. ** Excludes in situ cases.

NOTE: Sites Buccal Cavity to Thyroid, as listed above, exclude sites M9590 to M9989 of the ICD-O-2. See "Comparability of Codes" section of the Technical Notes for more information on the use of these codes in this report.